

Research Highlights

Does Early Smoking Signal Later Problems?

The observation that adolescents who smoke also tend to have a variety of other problems (including the use of alcohol and other drugs, academic difficulties, delinquency, and impaired relationships) is not new. But a recent series of studies by Phyllis Ellickson and her colleagues at RAND has extended those observations to examine the long-term social consequences of smoking in early adolescence. Whereas earlier studies focused on older adolescents, we have examined the trajectory of smoking from the middle school years to the end of high school and have assessed the association between early smoking (both committed smoking and "experimenting") and other concurrent high-risk behaviors as well as later behaviors. We found that even occasional smoking during the middle school years may contribute to later problems, including dropping out of high school.

The RAND Adolescent Panel Study was a longitudinal study of middle (junior) high school students from California and Oregon conducted to evaluate a drug prevention program we had developed for middle school children. We surveyed participants as seventh graders in 1985 and then, again, five years later. Rigorous tracking allowed us to retain nearly 70 percent of the seventh grade sample over this five-year period; weighting the sample allowed us to compensate for the remaining attrition.

Early Smoking Predicts Other High-Risk Behaviors Among Young Adolescents

Most studies that have linked smoking with other high-risk behaviors have done so in older adolescents. We wanted to assess the extent to which early smoking behavior might be associated with both concurrent and subsequent problem behaviors such as academic problems, use of other substances,

engaging in criminal activities, and early parenthood. To get a better sense of how these latter behaviors were really influenced by early smoking status, we categorized the participants by their smoking status in grade 7 into three groups: smokers, experimenters, and nonsmokers. *Smokers* were those who had smoked three or more times in the past year; *experimenters* had smoked, but fewer than three days in the preceding year and not in the past month; and *nonsmokers* were those who had never smoked. In our sample of seventh graders, nearly half (46 percent) were nonsmokers, nearly one-third (32 percent) were experimenters, and the remainder (22 percent) were smokers. We compared problem behaviors among the three groups of seventh graders.

Figure 1 shows that compared with seventh grade nonsmokers, seventh grade smokers were two to three times more likely to experience academic problems (such as frequent absences, poor grades, or grade repetition) and nearly four times more likely to have skipped classes or been suspended during middle school. Smokers in the seventh grade were also far more likely than their nonsmoking counterparts to abuse substances other than tobacco. They were 21 times more likely to engage in marijuana use or drinking on a weekly basis; eight times more likely to engage in binge drinking; and 36 times more likely to use hard drugs. The likelihood of having

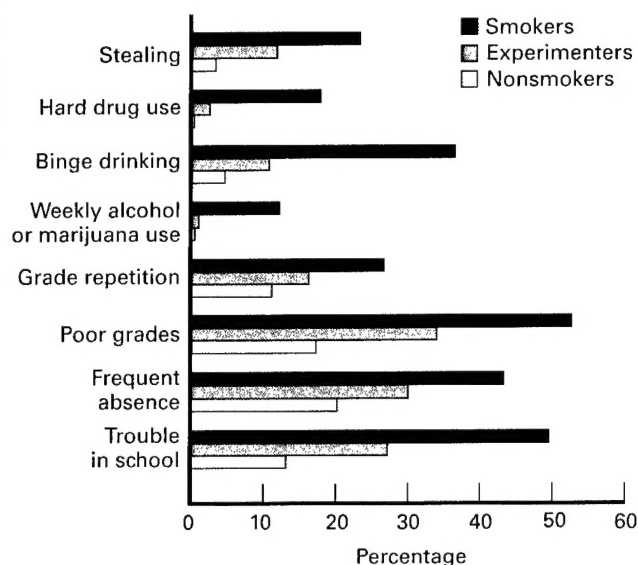
This Highlight summarizes RAND research reported in the following publications:

Ellickson PE, Bui K, Bell R, McGuigan K. Does early drug use increase the risk of dropping out of high school? *J Drug Issues* 1996;28(2):357-380. Also available as RP-725.

Ellickson PL, Tucker JS, Klein DJ. High-risk behaviors associated with early smoking: results from a 5-year follow-up. *J Adolesc Health* 2001;28(6):465-473. Also available as RP-962.

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Figure 1. Concurrent Problems of Grade 7 Nonsmokers, Experimenters, and Smokers



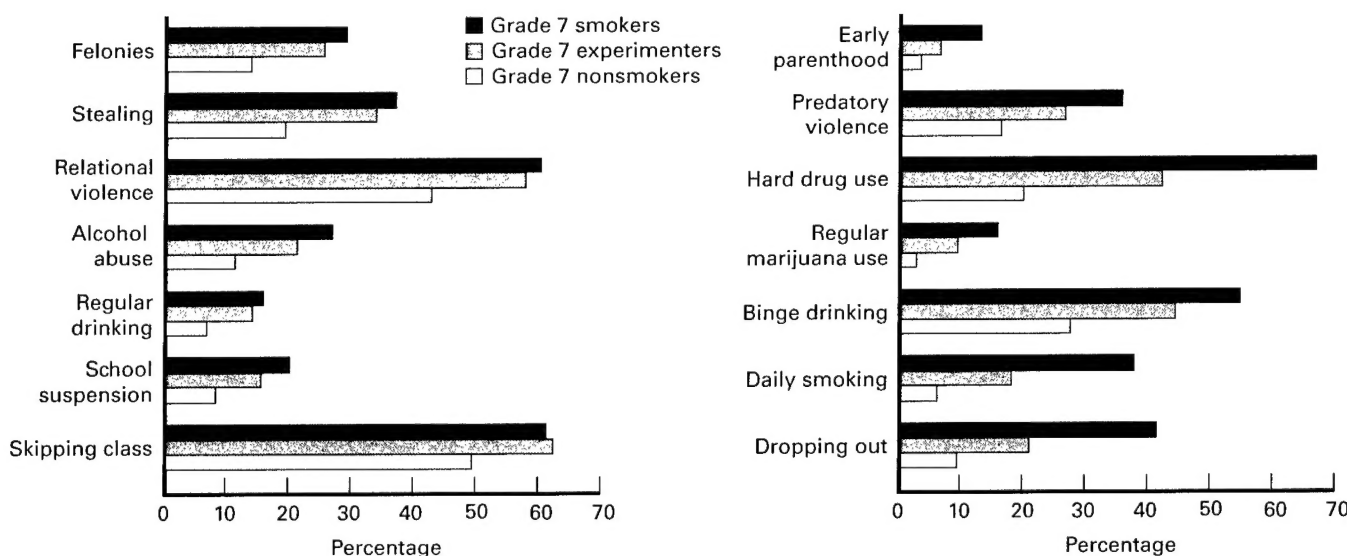
engaged in stealing was also seven times greater among smokers than nonsmokers.

What about seventh graders who only *experimented* with tobacco? Experimenters usually fell between nonsmokers and smokers in their tendency to exhibit problem behaviors during middle school: Compared with nonsmokers, experimenters were one and a half to two times more likely to have academic problems or behavioral problems in the classroom; two to five times more likely to engage in other substance abuse, and three and a half times more likely to have stolen. Thus, even young adolescents who had smoked only once or twice in the last year were far more likely to engage in other high-risk behaviors than those who did not smoke.

Early Smoking Also Predicts Other High-Risk Behaviors Among Older Adolescents

Given our observation that smoking in seventh grade was often associated with other problem behaviors during middle school, we also asked whether early smoking might predict the likelihood of engaging in other problem behaviors five years later. The answer is "Yes." By grade 12, early smokers were consistently more likely than early nonsmokers to experience a

Figure 2. Smoking in Seventh Grade Predicts Subsequent Problem Behaviors



Grade 7 experimenters and smokers were equally likely to have some problem behaviors by grade 12... but grade 7 smokers were more likely than experimenters to have other problem behaviors.

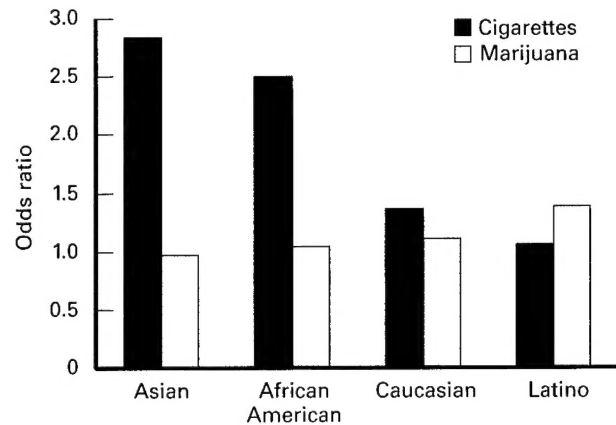
variety of academic problems, to engage in other types of substance abuse, and to exhibit delinquent and other problem behaviors (such as stealing, violence, felonies, and early parenthood). Early experimenters (those who as seventh graders had smoked fewer than three cigarettes in the previous year) were also more likely than nonsmokers to exhibit problem behaviors, including regular smoking, when they became older. Moreover, the risk behavior profiles of early experimenters and smokers grew more similar over time. By the end of high school, the two groups were equally likely to be regular drinkers, to abuse alcohol, to have committed a felony, and to have engaged in relational violence, shoplifted, skipped class, and been suspended from school in the last year (see Figure 2, left panel). However, the early smokers were comparatively more at risk than the experimenters for dropping out and related academic problems (poor grades, grade repetition); becoming parents; becoming regular smokers, marijuana users, or binge drinkers; escalating to other drugs; and engaging in predatory violence (right panel).

Can We Predict the Likelihood of Dropping Out of School?

These risk profiles show a strong association between smoking and subsequent problem behaviors. But they do not rule out the possibility that other factors, such as a predisposition to deviance or disaffection from school, explain the relationship. To explore this possibility, we decided to examine in greater detail what predicts dropping out of high school. Based on theory and empirical research, we sought to control for alternative explanations of why youth drop out of school, including limited educational aspirations, poor school performance, family disruption, and a general predisposition to engage in deviant or nonconformist behavior.

We considered many potential predictors, including early deviance and drug use (alcohol, cigarettes, or marijuana); family structure characteristics (parents' educational attainment and employment status, family disruption); and the added effects of academic orientation as indicated by course grades, grade repetition, educational aspirations, and number of schools attended. We also considered demographic variables such as gender, ethnic origin, and school environment. Because many of these characteristics go hand in hand, we analyzed the data in a way that took such associations into account. We found that smoking as a seventh grader predicted dropping out by

Figure 3. Effect of Cigarette or Marijuana Use on Risk for Dropping Out



the end of high school, even when we included these other predictors in the model (Figure 3). When we looked to see whether cigarette smoking portended dropping out for adolescents of various ethnic origins, we found that cigarette smoking was a strong predictor of dropping out for Caucasian, African American, and Asian teens, but not for Latino teens. Instead, we found that for Latino teens, early use of marijuana was a stronger predictor of subsequent dropping out.

Why does early smoking predict dropping out? We believe that two processes might be at work. First, smoking at an early age may mark a teen as being deviant: Teens may use smoking to signal their disaffection from school and from societal norms about appropriate behavior. In so doing, they may increase their association with other teens who have low educational aspirations, thereby reinforcing their disinterest in school and poor achievement. Alternatively, cigarette use may lead to the use of psychoactive drugs that impair cognitive performance and thus school performance.

What Are the Implications of These Findings?

Public policies and programs have had limited success in lowering the rates of teen smoking and use of other drugs as well as the dropout rate. Developing profiles of young nonsmokers, experimenters, and smokers has enabled us to identify elements that must be incorporated into successful intervention programs. Our findings concerning the links between early smoking and

concurrent and later high-risk behaviors suggest that prevention efforts aimed at youth who are already smoking should also address the other problems these teens may be facing. Furthermore, our finding that young adolescents who smoke only occasionally are at increased risk to be heavy smokers later on underscores the importance of starting smoking prevention programs early and continuing these efforts throughout high

school. Finally, our finding that dropping out of high school is predicted by early smoking suggests that the act of dropping out of school may in fact be a long process of disengagement that begins early in adolescence. Therefore, programs aimed at preventing or stopping smoking and use of other drugs in young adolescents may significantly reduce their risk of dropping out later.

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